



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Region 6  
1445 Ross Avenue, Suite 1200  
Dallas, Texas 75202 - 2733

August 15, 2018

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SURFACE WATER  
QUALITY BUREAU

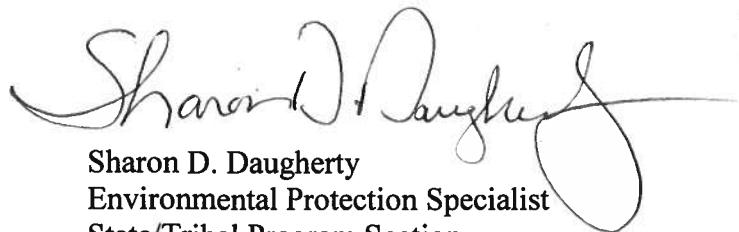
Miguel Montoya  
New Mexico Environment Department  
Surface Water Quality Bureau  
1190 South St. Francis Drive  
P.O. Box 5469  
Santa Fe, NM 87502-5469

Dear Mr. Montoya:

The Region 6 office completed its review of the Quality Assurance Project Plan (QAPP) for the *"Water Quality Monitoring to Determine Pollutant Loading Source for On-the-Ground Projects for the Mora River 17R Upper Canadian Plateau Phase 1A"*. The QAPP was approved on August 14, 2018 and will expire on August 15, 2021.

Please submit a revised/updated QAPP at least sixty (60) days prior to the expiration date. If no substantial technical or programmatic changes have occurred in the project, submit a letter stating that no changes are needed. This letter should also be submitted at least sixty (60) days prior to the expiration date.

Attached is the completed QAPP signature page for your records. In any future correspondence relating to this QAPP, please reference QTRAK #18-498. If you have any questions, feel free to contact me at (214) 665-2259.



Sharon D. Daugherty  
Environmental Protection Specialist  
State/Tribal Program Section

Enclosure

Quality Assurance Project Plan  
Water Quality Monitoring to Determine Pollutant Loading Sources  
for the Project:

On-The-Ground Improvement Projects for  
the Mora River 17-R- Upper Canadian Plateau Phase 1A

Clean Water Act Section 319

Submitted by  
New Mexico Environment Department

A. PROJECT MANAGEMENT

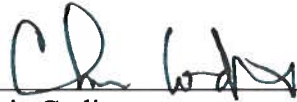
A1. Approval



Abe Franklin  
Program Manager, SWQB Watershed Protection Section

7/23/2018

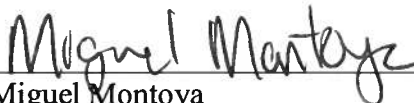
Date



Chris Cudia  
Project Officer, SWQB Watershed Protection Section

7-23-18

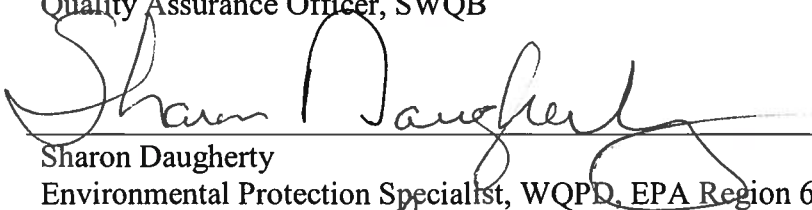
Date



Miguel Montoya  
Quality Assurance Officer, SWQB

7-23-18

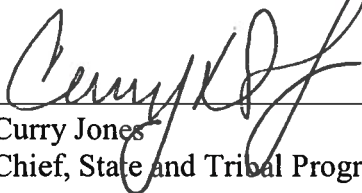
Date



Sharon Daugherty  
Environmental Protection Specialist, WQPD, EPA Region 6

8/14/18

Date



Curry Jones  
Chief, State and Tribal Programs Section, WQPD, EPA Region 6

8/14/18

Date

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## **ACRONYMS**

EPA	United States Environmental Protection Agency
HPWA	Hermit's Peak Watershed Alliance
NMED	New Mexico Environment Department
NMRAM	New Mexico Rapid Assessment Method
QAPP	Quality Assurance Project Plan
QA	Quality Assurance
QAO	Quality Assurance Officer
SWQB	Surface Water Quality Bureau
TMDL	Total Maximum Daily Load
WBP	Watershed Based Plan
WQPD	Water Quality Protection Division

### A3. Distribution List

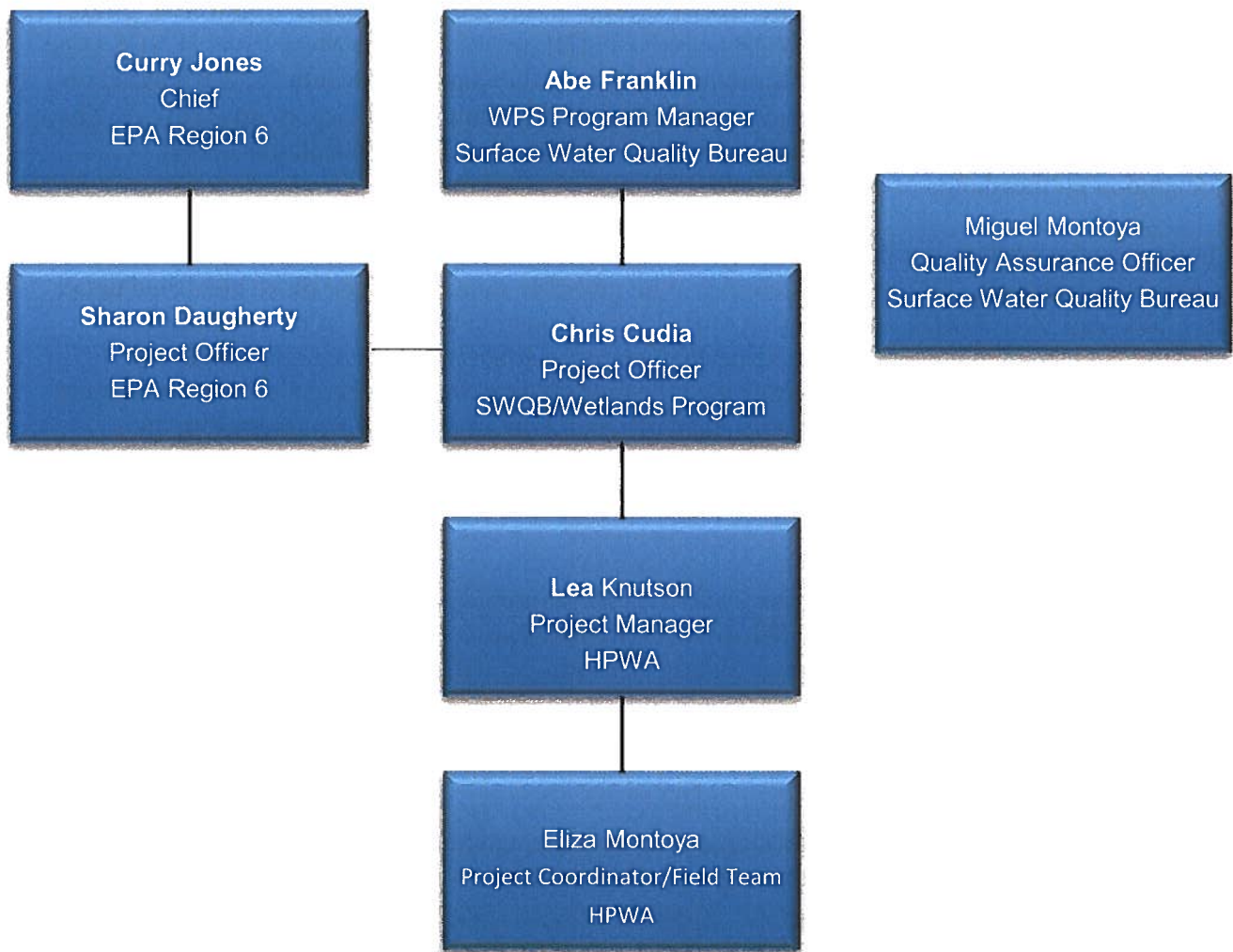
Table 1 below contains the distribution list, and project roles and responsibilities for this project. The Project Officer will ensure that copies of this approved QAPP and any subsequent revisions are distributed to the project personnel listed below. All members of the distribution list will review the QAPP and sign the Acknowledgment Statement prior to initiating any work for this project and return to Project Officer.

*Table 1. Distribution List and Project Roles and Responsibilities*

Name	Organization	Title/Role	Responsibility	Contact Information
<b>Abe Franklin</b>	SWQB	WPS Program Manager	Reviewing and approving QAPP, managing project personnel and resources.	(505) 827-2793 <a href="mailto:abraham.franklin@state.nm.us">abraham.franklin@state.nm.us</a>
<b>Chris Cudia</b>	SWQB	Project Officer/Field team/Trainer	Manage progress of project, preparing QAPP, project reporting, coordinating with contractors maintains project files, prepares final project report etc., data collection, training	(505) 827-2795 <a href="mailto:chris.cudia@state.nm.us">chris.cudia@state.nm.us</a>
<b>Miguel Montoya</b>	SWQB	QA Officer	Reviewing and approving QAPP, QA audits as needed to assure adherence to the approved QAPP.	(505) 827-2637 <a href="mailto:miguel.montoya@state.nm.us">miguel.montoya@state.nm.us</a>
<b>Lea Knutson</b>	HPWA	Project Manager	Project Oversight	(505) 425-5514 <a href="mailto:lknutson@hermitspeakwatersheds.org">lknutson@hermitspeakwatersheds.org</a>
<b>Eliza Montoya</b>	HPWA	Project Coordinator, Field team	Oversee field monitoring team in data collection and record keeping. Reporting to Project Manager. Nutrient sample collection and field surveys data collection	(505) 429-9521 <a href="mailto:emontoya@hermitspeakwatersheds.org">emontoya@hermitspeakwatersheds.org</a>
<b>Sharon Daugherty</b>	EPA	Project Officer Region 6	Reviewing and approving QAPP	(214) 665-2259 <a href="mailto:daugherty.sharon@epa.gov">daugherty.sharon@epa.gov</a>
<b>Curry Jones</b>	EPA	Chief, Region 6	Reviewing and approving QAPP	(214) 665-6793 <a href="mailto:jones.curry@epa.gov">jones.curry@epa.gov</a>

#### A4. Project Organization

Figure 1. Organization Chart Mora River-UCP Monitoring Project





## A5. Problem Definition Background

The Mora River is part of the Canadian River watershed, located in northeastern New Mexico. Nutrient assessment data collected in 2002 and 2006 at water quality monitoring stations located within the watershed demonstrated that the Mora River (USGS gage east of Shoemaker to Hwy 434) was impaired for nutrients/eutrophication biological indicators in 2007.

Once an impairment is identified on a particular waterbody, a TMDL is developed to serve as a planning document that establishes specific goals to meet water quality standards in waterbodies where pollutant limits are exceeded. It includes current pollution loadings, reduction estimates for pollutants, information on probable sources of pollution, and suggestions to restore or protect the health of the waterbody. The SWQB issued a TMDL in 2007 for the Mora River (USGS gage east of Shoemaker to Hwy 434) for nutrients which was then updated on July 22, 2015 based on the 2016-2018 State of New Mexico CWA §303(d)/§305(b) Integrated Report Appendix A. The updated TMDL sets numeric thresholds for Total Nitrogen and Total Phosphorus at the Ecoregion 26 thresholds of 0.38 mg/L and 0.03 mg/L, respectively.

Following the TMDL, the WBP for the Mora River (WBPMR) was developed to address the nutrient impairment. The WBPMR confirms the probable sources include those identified under the 2007 and 2015 TMDL as well as identified loss of riparian habitat, loss of wetlands, mass wasting and streambank modifications/destabilization as other probable sources of nutrient impairment. The assessment also confirmed the nutrient impairment where 8 out of 8 monitored sites exceeded nitrogen and phosphorus standards and 2 out of 8 sites were assessed as “not supporting” in the full NMED nutrient assessment. Further explanations of impairment are included in the “*Watershed Based Plan for the Mora River Upper Canadian Plateau*” on pages 42-58 and 82-87.

EPA funding under Section 319 of the Clean Water Act provides resources to implement activities described in a document: *Workplan, Nonpoint Source Program Effectiveness Assessment, 2008-2011*. The document states, “This project will develop and implement a statewide program to assess the effectiveness of 319 watershed projects on water quality.” Task 5 of the workplan, Monitoring, states that the project will conduct pre- and post- implementation monitoring.

Based on the updated TMDL, a total summer (May to September) load reduction of 46% for total phosphorus and 17% for total nitrogen would be needed to meet the target load and meet the established nutrient thresholds. The “*Watershed Based Plan for the Mora River Upper Canadian Plateau*” states, “The pollutant source summary for the Mora River (USGS gage east of Shoemaker to Hwy 434) identifies 54% of the total phosphorus and 62% of the total nitrogen as point source (from municipal and industrial source discharge).” While the point source pollution was taken into account while calculating loading rates and load reductions, the Watershed Based Plan Mora River (WBPMR) plan primarily addresses nonpoint sources of pollution as per the purpose of 319(h) Watershed Based Plans. Probable sources of impairment are identified in the 2007 TMDL as: flow alterations from water diversions, municipal point

source discharges and on-site treatment systems (septic systems and similar decentralized systems). The updated 2015 TMDL also adds the following probable sources: recreation pollution sources, silviculture harvesting, wildlife other than waterfowl, habitat modification, drought-related impacts, natural sources, and rangeland grazing. During the lower Mora Watershed WBP assessment, in addition to the previous mentioned sources, HPWA also identified loss of riparian habitat, loss of wetlands, mass wasting and streambank modifications/destabilization as other probable sources of nutrient impairment.

## **Objective**

The purpose of the Project is to reduce sediment loading which is believed to be directly correlated with mobilization of nutrients. Data collected before and after treatment methods will quantify the response and effectiveness of these projects in the Mora Watershed (USGS HUC 110800040205, 110800040206, 110800040207, 110800040208, 110800040309, 110800040401, 110800040402, 110800040403, 110800040501, 110800040502, 110800040503, and 110800040505).

When changes affect the scope, implementation or assessment of the outcome, this QAPP will be revised to keep project information current. The Project Officer, with the assistance of the QA Officer, will determine the impact of any changes on the technical and quality objectives of the project. This Project Plan will be reviewed annually by the Project Officer to determine the need for revision.

## **A6. Project/Task Description**

### **Description**

The Mora River-UCP Monitoring Project will monitor nutrients, stream flow, stream morphology, and riparian vegetation pre- and post-treatment of Best Management Practice (BMPs) implementation to determine load reductions achieved from on the ground BMPs implementation.

### **Schedule**

Locations for monitoring sites were determined prior to any monitoring and were chosen based on proximity and potential impact from the restoration activities with emphasis on capturing both an upstream and downstream area for each restoration activity. Pre-treatment monitoring is planned to be conducted at eight (8) sites between 2018 and 2019. Post-treatment monitoring is planned for the same eight (8) sites throughout 2019 and 2020. Data derived from project will be evaluated using the Spreadsheet Tool for Estimating Pollutant Load (STEPL) model to determine potential load reductions resulting from BMP implementation.

**Nutrient Assessments** will be conducted no less than two (2) times at each of the sites between July and November in 2018 and 2020. Nutrient samples will be collected and analyzed in accordance with NMED's Standard Operating Procedure for Chemical Sampling in Lotic

Environments (SWQB 2015a). The purpose of these stations is to detect any changes in nutrient concentration trend (Figure 2).

**Sonde Deployment** (YSI 6920 VS) will be conducted at the same time as, or shortly after, nutrient sampling. Sondes will be calibrated and maintained in accordance with SWQB's SOP for Sonde Calibration and Maintenance (SWQB 2018a) and instantaneous measurements will be collected during sonde deployment in accordance with SWQB's SOP for Sonde Deployment (SWQB 2018b). Instantaneous measurements will be collected at each monitoring site after nutrient sample collection is completed. Sonde instruments contain multi-parameter probes that can collect data for pH, specific conductivity, dissolved oxygen concentration, percent dissolved oxygen, and turbidity. For this project temperature, dissolved oxygen concentration, percent dissolved oxygen and turbidity will be collected at all monitoring sites. The data from these parameters will be used to give a broad overview of nutrient loading in the sampled reach. Fluctuation in values for these parameters in conjunction with nutrient concentrations pose potential harmful effects on aquatic life and coincide with harmful algal blooms. Specific conductivity and pH data will be collected as secondary data. Secondary data may be used by SWQB at a later time.

**Stream flow** will be collected in conjunction with sonde deployment. Stream flow will be collected at all monitoring sites after sonde deployment has occurred and instantaneous measurements have been recorded in field notebook. Stream flow will be collected with a USGS Pygmy Current Meter in accordance with SWQB's SOP for Stream Flow Measurements (SWQB 2015b). Stream flow data is necessary to calculate load.

**Stream morphology** (geomorphic metrics) will be conducted once during each monitoring year in accordance with the SWQB's SOP for Physical Habitat Measurements (SWQB 2016a). Cross sectional and longitudinal profiles will be measured at Best Management Practices (BMPs) implementation locations pre- and post-treatment (see section B1). It is believed that restoration implementation on the Mora River will reduce erosion rates and subsequently reduce sediment/nutrient loading to the Mora River.

**Riparian habitat** (greenline vegetation) will be conducted in accordance with *Monitoring the Vegetation Resources in Riparian Areas* (Winward 2000) once during each monitoring year. Greenline vegetation will be completed at BMP implementation sites pre-and post-treatment (see section B1). Greenline vegetation surveys will occur during a time in which plants are in full foliage. Surveys will be conducted at the same time of year for consistency purposes.

**Photographic documentation** will be collected in conjunction with stream morphology and riparian habitat surveys and conducted using the protocols identified in *Let the Water Do the Work* (Zeedyk, et al, 2009). Photographic documentation with supporting nutrient data will provide evidence of the efficacy of the treatments on the Mora River.

*Table 2. Products and Timeline*

<b>Task</b>	<b>Timelines</b>	<b>Product</b>
Project Management and Administration	March 2018 to June 2018	Stakeholder feedback on potential BMP implementation treatments that will reduce load reductions identified in TMDL
Complete QAPP	July 2018	Complete Quality Assurance Project Plan ensuring measures are in place to collect quality data.
Collect nutrient samples, sonde instantaneous measurements and record stream flow data.	July to November (2018 and 2020)	Total Phosphorus, Total Kjeldahl Nitrogen and Nitrate + Nitrite data along with Sonde and Stream flow data for 8 monitoring location identified in Figure 2.
Conduct stream morphology and greenline vegetation transects. Photographic documentation recorded.	Once yearly for all monitoring years. Conducted during same time of year throughout project.	Cross sectional, longitudinal profile and greenline vegetation data pre-and post-implementation of BMPs. Photographic documentation at stream morphology transects and greenline vegetation transects. Transects monumented for future data collection efforts with GPS unit.
STEPL Data Analysis	December 2018 to January 2021	Analyze results of field data through STEPL modeling to determine if BMPs implementation resulted in load reduction of nutrients.
Final Report	March 2021	Complete Final report

Figure 2. Continuous Monitoring Stations

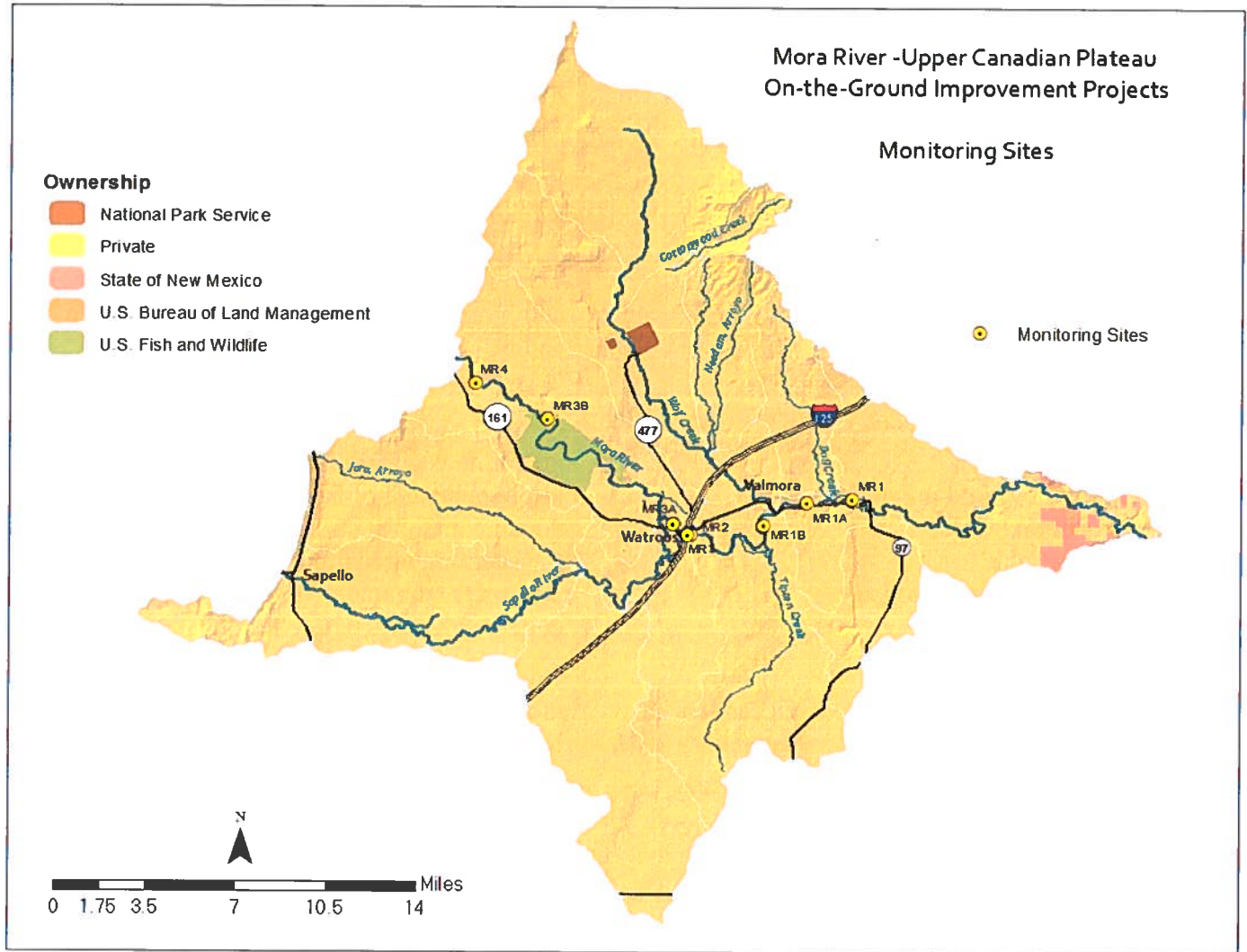


Table 3. Waterbody Attributes for the Mora River- UCP Monitoring Project

<u>Waterbody</u>	<u>Assessment Unit ID</u>	<u>12-Digit HUC</u>	<u>12-Digit HUC Name</u>
<b>Mora R</b>	NM-2305.A_00	110800040309	Sapello River-Mora River
<b>Wolf C</b>	NM-2305.3.A_10	110800040401	Headwaters Wolf Creek
<b>Wolf C</b>	NM-2305.3.A_10	110800040403	Outlet Wolf Creek
<b>Mora R</b>	NM-2305.A_00	110800040501	Tiptun Creek-Mora River
<b>Mora R</b>	NM-2305.A_00	110800040502	Dog Creek
<b>Mora R</b>	NM-2305.A_00	110800040503	Cherry Valley Lake
<b>Mora R</b>	NM-2305.A_00	110800040505	Arroyo Tierra Blanca-Mora River



## A7. Quality Objectives and Criteria for Measurement Data

### Question/Decision

The Mora River-UCP Monitoring Project is intended to answer the flowing question: What are the stream load reductions as a result of BMP implementing in the Mora Watershed.

Stated as a decision: The information gathered by the Mora River-UCP Monitoring Project will be used as STEPL Model inputs as applicable to determine potential load reductions resulting from BMP implementation.

### Data Quality Objective

The quality of the data will be collected according to Standard Operating Procedures and methodology identified in this QAPP (See section B2) in order to provide a high level of confidence in determining the effects of restoration on the Mora River.

### Measurement Quality Objectives

The measurement quality objectives will be sufficient to achieve the DQO and will be in conformance with those listed in the SWQB QAPP (Water Quality Management Programs 2016). The Data Quality Indicators listed in the SWQB's QAPP applicable to the data collected for this project are precision, accuracy, bias, representativeness, comparability, and completeness.

DQI	Determination Methodologies
Precision	will be ensured by using the standardized procedures identified in this QAPP. Having two trained field team members present at all time while collecting data. Analytical methods for nutrients and method reporting limits for the laboratory will be within a sensitivity that is able to report below the established nutrient thresholds.
Accuracy	the basis for determining accuracy will be staff's expertise of the survey method for collecting data and ensuring the accuracy of the equipment being used is within the required range of a particular survey.
Bias	is to reduce the systematic or persistent distortion of any measurement process, bias will be minimized by using professional and experienced staff to collect and analyze data.

Representative	monitoring location were chosen based on proximity and potential impact from the restoration activities with emphasis on capturing both an upstream and downstream area for each restoration activity.
Comparability	monitoring locations will be monumented for repeat sampling events to compare pre- and post-treatment data. Methods listed under this QAPP for data collection are standardized and reproducible with the intent to be comparable to other studies
Completeness	surveys and methodologies will be completed in their entirety as identified in this QAPP

#### A8. Special Training/Certification

This project will be primarily implemented by HPWA employees who will be trained by SWQB Project Officer in accordance with the procedures identified in SOP's referenced in this QAPP. No further specialized training is required for SWQB staff working under this project. Training of cooperating personnel will be in accordance with the SOP's identified in this QAPP. Training of student interns will be conducted in the field with hands on training and will be led by NMED SWQB Project Officer (if workshops are available) or by HPWA staff.

#### A9. Documents and Records

The Project Officer will make copies of this QAPP and any subsequent revisions available to all individuals on the distribution list.

All personnel involved with data collection will use a bound field notebook to collect in-field data. Field personnel will submit copies of field notes and samples to the Project Coordinator at the end of each field survey. Metadata associated with analytical samples will be documented in the field notebooks and on the chain of custody sheets which will be used to transport the samples to the analytical laboratory. Metadata will include, at a minimum, the date, time, ambient temperature, staff present during sampling, location with latitude and longitude coordinates, media collected, volume collected, sample reference ID, parameter sampling for, as well as preservation used. The Project Coordinator will take analytical samples to the laboratory for analysis along with completed chain of custody documents; compile field notes; and provide copies of each to the Project Officer who will record and file the documents in the project file at the SWQB office in Santa Fe, NM.

Analytical reports and associated laboratory QA documents will be submitted to the Project Coordinator who will provide a copy to the Project Officer for the project file. Eliza Montoya, HPWA Project Coordinator will ensure that the analytical laboratory is able to analyze nutrients in a range below the established nutrient threshold and includes the method detection limits, laboratory minimum reporting limit (MRL), sample detection limits (SDL) for laboratory

analysis performed on nutrient grab samples obtain for this project. Laboratory will also provide any other reporting definition pertaining to results from analysis done on nutrient samples. Eliza Montoya, HPWA Project Coordinator will also require the laboratory to report results of nutrient analysis in an electronic data deliverable format as well as a narrative report.

All final reports generated by the Project Officer will be provided to EPA and NMED and a hard copy will be placed in the project file. Project documents include this QAPP, field notebooks, calibration records, validation and verification records, and sample collection data, records of analytical data in hard copy or in electronic form and QC records. Also included are project interim and final reports. Documents held by the Project Officer will be maintained in accordance with the requirements of the Bureau's QAPP Documentation and Records section.

## B. DATA GENERATION AND ACQUISITION

### B1. Sampling Process Design

The study design consists of eight (8) monitoring sites in various location within the Mora Watershed. Monitoring site locations upstream and downstream of tributary confluences will be used to determine the inputs of tributaries. Monitoring sites upstream and downstream of areas with greater population density (Watrous, NM) will be used to establish the inputs of human impacts and finally the monitoring sites located upstream and downstream of wetlands will be used to ascertain rates of denitrification. Monitoring locations were identified during the monitoring phase for the Watershed Based Plan (Figure 2). These sites will be used again upon acquiring permission from landowners. Monitoring will be conducted at locations representative of ambient stream conditions, generally in the transition between a riffle/run and a pool, or at the toe of a pool, rather than in shallow riffles or deep pools.

Field team will collect nutrient samples in accordance with SWQB SOP 8.2, Chemical sampling in Lotic Environments. All applicable sections of SWQB SOP 8.2 will be adhered to during nutrient sample run. A sample run is defined as a 24-hour period where all eight (8) monitoring sites were sampled or visited. Nutrient grab samples will be collected at each of the eight (8) monitoring sites during a sample run (if stream flow is sufficient to obtain sample). A minimum of two (2) different sample runs will occur between July and November at the beginning and the end of the contractual period. Sample runs will consistently occur during same month for each monitoring year.

Field team will collect instantaneous measurements with sonde at the each of the eight (8) monitoring sites in accordance with the SWQB SOP 6.2, Sonde Deployment. Instantaneous measurements collected during sonde deployment will occur during sample run for nutrient sample collection. The sonde will provide instantaneous measurement of the following field parameters during sampling events: temperature, pH, specific conductivity, dissolved oxygen concentration, percent dissolved oxygen, and turbidity.



Field team will collect Stream flow at all eight (8) monitoring locations after sonde deployment has occurred during a sample run. Stream flow will be collected in accordance with the SWQB SOP 7.0, Stream Flow Measurement.

Field team will collect geomorphic metrics before and after BMP implementation in accordance with the SWQB SOP 5.0, for Physical Habitat Measurements. Field team will consist of at least two persons at all times while conducting surveys. Stream morphology surveys include cross sectional and thalweg (longitudinal) profiles. Cross sectional and longitudinal profiles will be measured at BMP implementation sites before and after BMP implementation. Cross-sections will be located at BMP implementation locations and monumented with rebar pins (right bank and left bank) for repeatability. Rebar locations will be recorded with a GPS unit for accuracy and verification for later sampling events.

Field team will conduct greenline vegetation surveys at each of the BMP implementation sites in accordance with *Monitoring the Vegetation Resources in Riparian Areas* (Winward 2000) once during each monitoring year (pre- and post-treatment). Field team will consist of at least two persons at all time while conduction survey. Greenline vegetation surveys will use the rebar monumented from stream morphology surveys as starting point to begin greenline vegetation survey.

Photographic documentation will be done in conjunction with stream morphology and greenline vegetation surveys. Field team will conduct photographic documentation in accordance with *Let the Water Do the Work* (Zeedyk, et al, 2009). Photographic documentation will be taken from permanent monitoring locations.

STEPL (US EPA) modeling will be completed after BMP implementation to quantify potential load reduction.

## B2. Sampling Methods

Nutrient Sampling will be conducted in accordance with SWQB SOP 8.2, Chemical sampling in Lotic Environments. All applicable sections of SWQB SOP 8.2, for nutrient sampling will be adhered to during nutrient sample collection which include sections 4.1 Quality Control, 6.0 Collecting Water Samples, 6.1 Sample Collection and Processing for Specific Parameters specifically 6.1.2 Nutrients, and 6.4 Handling, Packaging and Transporting Samples.

Sondes will be deployed at monitoring locations in accordance with the SWQB SOP 6.2 Sonde Deployment. Sonde Deployment protocol will follow the Step-by-step Process section identified in SWQB SOP 6.2 and will gather instantaneous measurement in accordance with section 6.1.2 Instantaneous Measurements (All Units).

Stream flow will be collected with a USGS Pygmy Current Meter. Stream flow will be collected in accordance with SWQB SOP 7.0, Stream Flow Measurement.

Stream morphology conditions will be assessed using the SWQB SOP 5.0, Physical Habitat Measurements. Procedures for data collection are identified in section 6.3.2 Cross Sectional Profile, Thalweg and Large Woody Debris Tally in SWQB SOP 5.0. Procedure will be modified to use a laser level.

Greenline vegetation surveys will be done in accordance with *Monitoring the Vegetation Resources in Riparian Areas* (Winward 2000). Greenline vegetation surveys will follow procedures identified in the Greenline Composition section. A vegetation identification handbook will be carried by field team for identification of vegetation community type classification.

Photographic documentation will be conducted using the protocols identified in *Let the Water Do the Work* (Zeedyk, et al, 2009) Appendix I, Outline for Photographic Monitoring Plan. Photo points will be recorded using Permanent Photo Point-Record-Initial Take (Form 1).

STEPL modeling will be done in accordance with the instructions provided on the US EPA website.

### B3. Sample Handling and Custody

Sample handling and custody will be done in accordance with SWQB SOP 8.2, Chemical Sampling in Lotic Environments section 6.4 Handling, Packaging and Transporting Samples.

### B4 Analytical Methods

Nutrient analysis of water grab samples collected on the Mora River will be analyzed at the Montana State Environmental Laboratory located in Helena, MT. Nutrient analysis consists of analyzing water samples for Total Phosphorus, Total Kjeldahl Nitrogen and Nitrate + Nitrite. Analysis will be conducted by trained laboratory staff and will be analyzed using standardized EPA laboratory protocol for Total Phosphorus, Total Kjeldahl Nitrogen and Nitrate + Nitrite.

Analytical instruments and equipment used by Montana State Environmental Laboratory are calibrated prior to each instrument analysis batch using manufacturer's recommended procedures and the guidelines provided in the Handbook for Analytical Quality Control (EPA 1979). All calibrations procedures are validated and documented by the Montana State Environmental Laboratory and are described in the laboratory's QAPP or equivalent.

### B5. Quality Control

Quality control (QC) activities are technical activities performed on a routine basis to quantify the variability that is inherent to any environmental data measurement activity. The purpose for conducting QC activities is to understand and incorporate the effects the variability may have in the decision making process. Additionally, the results obtained from the QC analysis, or data

quality assessment, may identify areas where the variability can be reduced or eliminated in future data collection efforts, thereby improving the overall quality of the project being implemented.

Quality Control mechanisms are implemented as described under the Quality Objectives and Criteria for Measurement Data as well as the sampling methodologies identified under this QAPP. Additional Quality Control includes the professional expertise of the personnel working under this project.

#### B6. Instrument/Equipment Testing, Inspection and Maintenance

The primary equipment needing maintenance, testing and inspection are a sonde, flow meter and laser level. Requirements and procedures are specified in the SWQB SOPs.

1. YSI 6920 V2 Sonde, SWQB SOP 6.1,
2. USGS Pygmy Current Meter, SWQB SOP 7.0 Attachment 2,
3. Pro Shot Laser L4.7, calibrated annually to manufacture specifications.

#### B7. Instrument/Equipment Calibration and Frequency

A calibration log will be kept and maintained for the duration of the project for all monitoring devices. Procedures for the maintenance of calibration records are specified in the SWQB's QAPP for Water Quality Management Programs. For this project, specific calibration requirements apply to sondes, flow meters, and laser levels. Sondes will be calibrated according to SOP 6.1 Sonde Calibration and Maintenance before and after deployment. Flow meters will be calibrated according to SOP 7.0 Flow. Laser level will be maintained and calibrated annually to manufacture specifications.

#### B8. Inspection/Acceptance of Supplies and Consumables

Consumables that have potential to affect the quality of data collected during the project are calibration standards solutions and grab sample containers for nutrient sampling. HPWA staff will visually inspect calibration standard solutions for contamination and ensure expiration date has not been exceeded before each use. Calibration standard solution will be stored in conditions as specified by manufacturer specifications. This project will use new grab sample containers at each monitoring site for each sample run and handle container in accordance with SWQB SOP 8.2 Chemical Sampling in Lotic Environments, section 6.0 Collecting Water Samples.

#### B9. Non-direct Measurements see example below

No non-direct measurements used during the course of this project will affect the quality of data related to this project.

## B10. Data Management

Data obtained for this project are maintained in paper and electronic files by SWQB Project Officer and HPWA. Data collected by HPWA staff will be delivered to SWQB Project Officer as soon as practical following the data collection event. Data will be submitted to SWQB Project Officer at least quarterly. All data will be maintained in the project file at the NMED SWQB. Electronic data will be backed up on the SWQB network storage and the hard drive of SWQB Project Officer in Santa Fe, NM.

## C. ASSESSMENT AND OVERSIGHT

### C1. Assessment and Response Actions

The SWQB Project Officer will provide project oversight by periodically assisting with and/or reviewing data collection efforts. SWQB Project Officer will conduct monthly reviews of data collection efforts. The SWQB Project Officer will assess project progress to ensure the QAPP is being implemented, including periodic audits by the QAO, as needed. Any problems encountered during the course of this project will be immediately reported to the SWQB Project Officer who will consult with appropriate individuals to determine appropriate action. Should the corrective action impact the project or data quality, the SWQB Project Officer will alert the Quality Assurance Officer. If it is discovered that monitoring methodologies must deviate from the approved QAPP, a revised QAPP must be approved before work can be continued. All problems and adjustments to the project plan will be documented in the project file and included in the final report.

### C2. Reports to Management

Semiannual reports are submitted by the contractor to the SWQB Project Officer and include progress of project implementation and any available data. Printouts, status reports or special reports for SWQB or EPA will be prepared upon request. Separate annual monitoring reports will also be provided and included in the final report. The SWQB Project Officer will be responsible for maintaining project progress in the EPA Grants Reporting and Tracking System and the final report, and all other required project deliverables to be submitted to the EPA under this grant.

## D. DATA VALIDATION AND USABILITY

### D1. Data Review, Verification and Validation

Data will be reviewed by the field team prior to demobilization from the field site. Data will be considered usable if there is reasonable evidence that the requirements of this QAPP were

followed and the data is within acceptable range limits as defined under this QAPP. Data that appears incomplete or questionable for the parameter will be flagged for review. Flagged data will be discussed with the Project Officer to determine the potential cause and usability. If a reasonable justification for use of the data cannot be attained, those data will be not used in analysis in determining the impacts of BMP implementation activities unless the data can be recollected and assessed for usability.

## D2. Validation and Verification Methods

The SWQB Project Officer will ensure that valid and representative data are acquired. Verification of field sampling and analytical results will occur in the review of data performed by the SWQB Project Officer in accordance with all applicable sections of the SWQB's SOP for Verification and Validation. In the event gross errors or other questionable data are found, the SWQB Project Officer will consult with project personnel to determine the validity of the data. SWQB Project Officer will also ensure the completeness of records and verification of calibration. Results of the verification process will be included in the final reports to EPA.

## D3. Reconciliation with User Requirements

The user requirement is a restatement of the data quality objective: The quality of the data will be adequate to provide a high level of confidence in determining the load reductions as a result of BMP implementation within the Mora Watershed

If project results do not meet this requirement, then additional monitoring may be necessary to fill in data gaps or it may be necessary to extend the monitoring period to measure effects that were not apparent during the project period.

## E. REFERENCES

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## Appendix 1. QAPP Acknowledgement Form



New Mexico Environment Department Surface Water Quality Bureau

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### Water Quality Monitoring to Determine Pollutant Loading Sources

#### Quality Assurance Project Plan Acknowledgement Statement

This is to acknowledge that I have received a copy Water Quality Monitoring to Determine Pollutant Loading Sources Quality Assurance Project Plan. As indicated by my signature below, I understand and acknowledge that it is my responsibility to **read, understand, become familiar with and comply** with the information provided in the document to the best of my ability.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Name (Please Print)

\_\_\_\_\_  
Date

***Return to SWQB Project Officer (Chris Cudia)***